

Platinum

CAS No. 7440-06-4

General Information

Platinum is a silver-gray, lustrous metal found naturally in extremely low amounts in the earth's crust and typically is associated with sulfide-ore bodies of nickel, copper, and iron. Important properties of platinum are resistance to corrosion, strength at high temperatures, and high catalytic activity. Platinum-rhodium compounds are used in glass and glass-fiber manufacture and in high-temperature thermocouples. Platinum compounds are also used in electrodes and jewelry, as oxidation catalysts in chemical manufacturing, and in thick-film

circuits printed on ceramic substrates. Platinum-rhodium and platinum-palladium crystals are used as catalysts in petroleum refining and to control automobile-exhaust emissions.

Higher environmental soil concentrations of platinum have been associated with nearby roadways (Farago et al., 1998). Workplace air standards for external exposure are generally established for soluble salts (OSHA, ACGIH) or recommended for the metal form (NIOSH). The pharmaceutical, cisplatin, is an animal carcinogen (NTP) and a possible human carcinogen. The carcinogenicity of other platinum compounds is unknown. Information about external exposure (environmental levels) and health effects is available (NRC/NAS, 1977).

Table 25. Platinum

Geometric mean and selected percentiles of urine concentrations (in µg/L) for the U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 1999-2000.

	Geometric mean (95% conf. interval)	Selected percentiles (95% confidence interval)						Sample size
		10th	25th	50th	75th	90th	95th	
Total, age 6 and older	*	< LOD	< LOD	< LOD	< LOD	< LOD	< LOD	2465
Age group								
6-11 years	*	< LOD	< LOD	< LOD	< LOD	< LOD	< LOD	340
12-19 years	*	< LOD	< LOD	< LOD	< LOD	< LOD	< LOD	719
20 years and older	*	< LOD	< LOD	< LOD	< LOD	< LOD	< LOD	1406
Gender								
Males	*	< LOD	< LOD	< LOD	< LOD	< LOD	< LOD	1227
Females	*	< LOD	< LOD	< LOD	< LOD	< LOD	< LOD	1238
Race/ethnicity								
Mexican Americans	*	< LOD	< LOD	< LOD	< LOD	< LOD	< LOD	884
Non-Hispanic blacks	*	< LOD	< LOD	< LOD	< LOD	< LOD	< LOD	568
Non-Hispanic whites	*	< LOD	< LOD	< LOD	< LOD	< LOD	< LOD	822

< LOD means less than the limit of detection, which is 0.03 µg/L.

* Not calculated. Proportion of results below the limit of detection was too high to provide a valid result.

Interpreting Urine Platinum Levels Reported in the Tables

Urine platinum levels were measured in a subsample of NHANES participants aged 6 years and older. Subsamples were randomly selected within the specified age range to be a representative sample of the U.S. population. In the current NHANES 1999-2000 subsample, urinary platinum levels were not detectable in 98.8% of the sample (detection limit was 0.03 µg/L). Previous studies reporting measurements in normal populations have found detectable and higher values than those reported in Table 25 (Vaughan et al., 1992; Paschal et al., 1998) and are possibly due to methodologic differences, although population differences may exist. Platinum-

industry and precious-metal workers can have urinary concentrations 1,000 times higher than unexposed populations (Schierl et al., 1998). Gold-platinum alloys used for dental fillings also may contribute to urinary platinum concentrations (Schierl et al., 2001).

Table 26. Platinum (creatinine adjusted)

Geometric mean and selected percentiles of urine concentrations (in µg/gram of creatinine) for the U.S. population aged 6 years and older, National Health and Nutrition Examination Survey, 1999-2000.

	Geometric mean (95% conf. interval)	Selected percentiles (95% confidence interval)						Sample size
		10th	25th	50th	75th	90th	95th	
Total, age 6 and older	*	< LOD	< LOD	< LOD	< LOD	< LOD	< LOD	2465
Age group								
6-11 years	*	< LOD	< LOD	< LOD	< LOD	< LOD	< LOD	340
12-19 years	*	< LOD	< LOD	< LOD	< LOD	< LOD	< LOD	719
20 years and older	*	< LOD	< LOD	< LOD	< LOD	< LOD	< LOD	1406
Gender								
Males	*	< LOD	< LOD	< LOD	< LOD	< LOD	< LOD	1227
Females	*	< LOD	< LOD	< LOD	< LOD	< LOD	< LOD	1238
Race/ethnicity								
Mexican Americans	*	< LOD	< LOD	< LOD	< LOD	< LOD	< LOD	884
Non-Hispanic blacks	*	< LOD	< LOD	< LOD	< LOD	< LOD	< LOD	568
Non-Hispanic whites	*	< LOD	< LOD	< LOD	< LOD	< LOD	< LOD	822

< LOD means less than the limit of detection (see previous table for LOD).

* Not calculated. Proportion of results below the limit of detection was too high to provide a valid result.